Transverse kinetic energy and excitation energy

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A study of the multifragmentation data obtained at the LBNL Bevelac by the EOS collaboration from the reaction of Au + C at 1.0 AGeV [1], [2] was performed in order to dispense with the transverse energy, KE_t, as a global variable, and replace it with a reconstructed excitation energy, E^*.

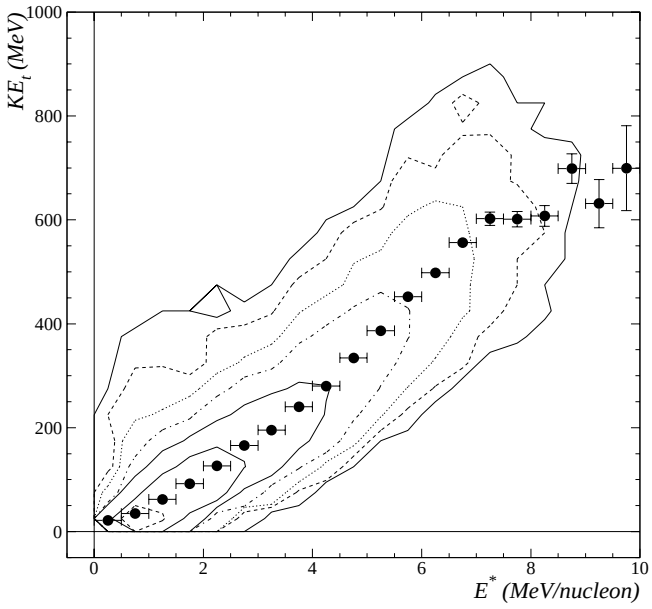

Figure 1: Thermal transverse kinetic energy (in MeV) as a function of corrected excitation energy (in MeV/nucleon). Solid circles show the mean and error on the mean of KE_t. Outermost contours show three counts. Each following contour line is the next higher power of three, *e.g.* 3^1, 3^2, 3^3, ...

Previous analysis of the gold multifragmentation data has lead to the reconstruction of the excitation energy of the multifragmenting system that has been corrected to account for collective expansion energy [2].

The simultaneous availability of total transverse energy and excitation energy allows for the verification of the assumption of proportionality between the two variables [3], [4], [5]. Fig. 1 shows the correlation of E^* and KE_t. It can be seen that the two quantities are indeed strongly correlated, and that the correlation is reasonably linear.

The ability to substitute here the true reconstructed excitation energies for transverse energies (the two quantities are found to be approximately proportional to one another) permits the construction of unambiguous Arrhenius plots [6].

References

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